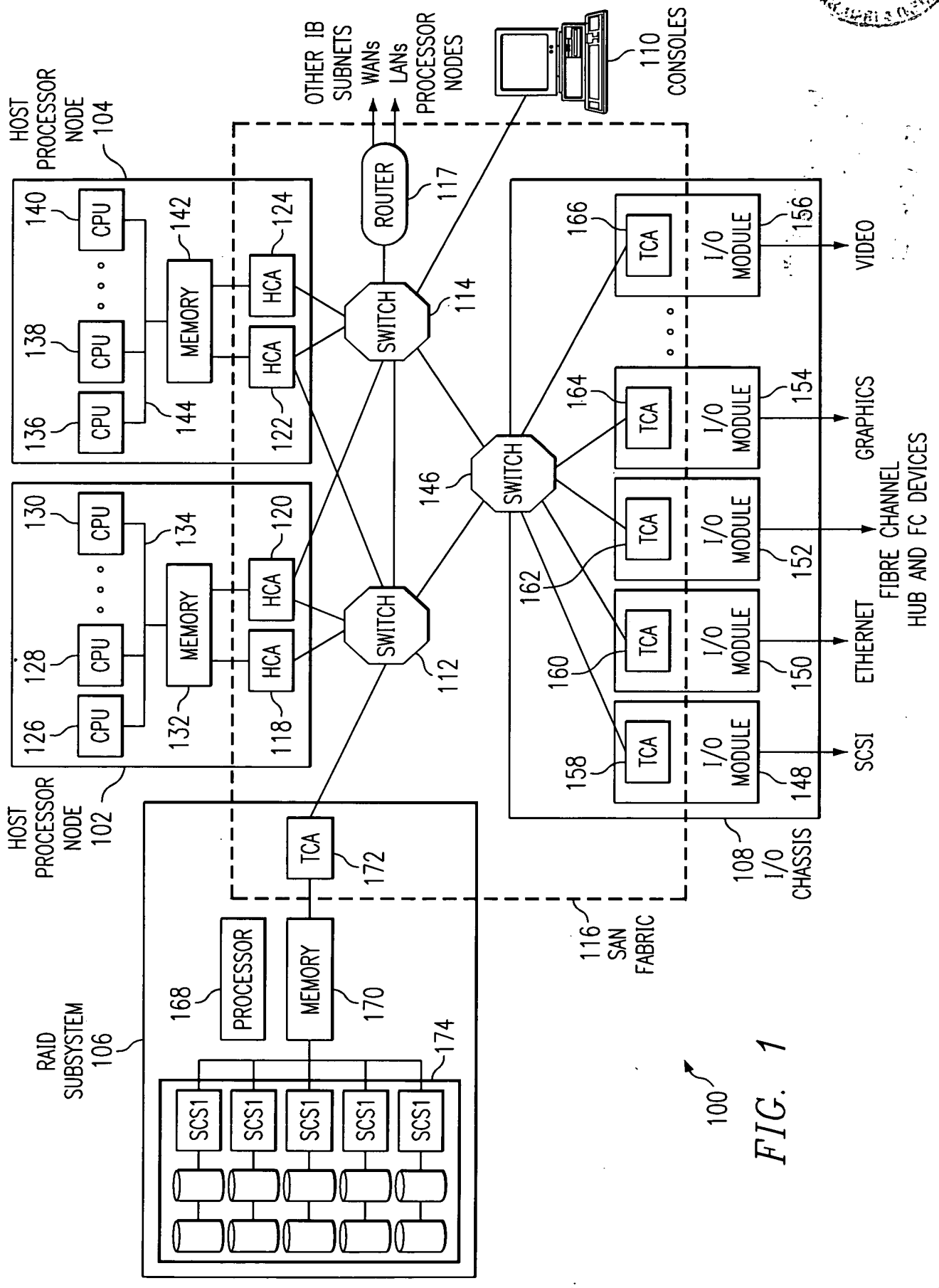

HOST PROCESSOR NODE 104
HOST PROCESSOR NODE 102
CPU
MEMORY
HCA
SWITCH
ROUTER
OTHER IB SUBNETS
WANs
LANs
PROCESSOR NODES
110 CONSOLES
TCA
I/O MODULE
VIDEO
GRAPHICS
FIBRE CHANNEL HUB AND FC DEVICES
ETHERNET
SCSI
108 I/O CHASSIS
116 SAN FABRIC
RAID SUBSYSTEM 106
PROCESSOR
SCSI
100

FIG. 1

FIG. 2

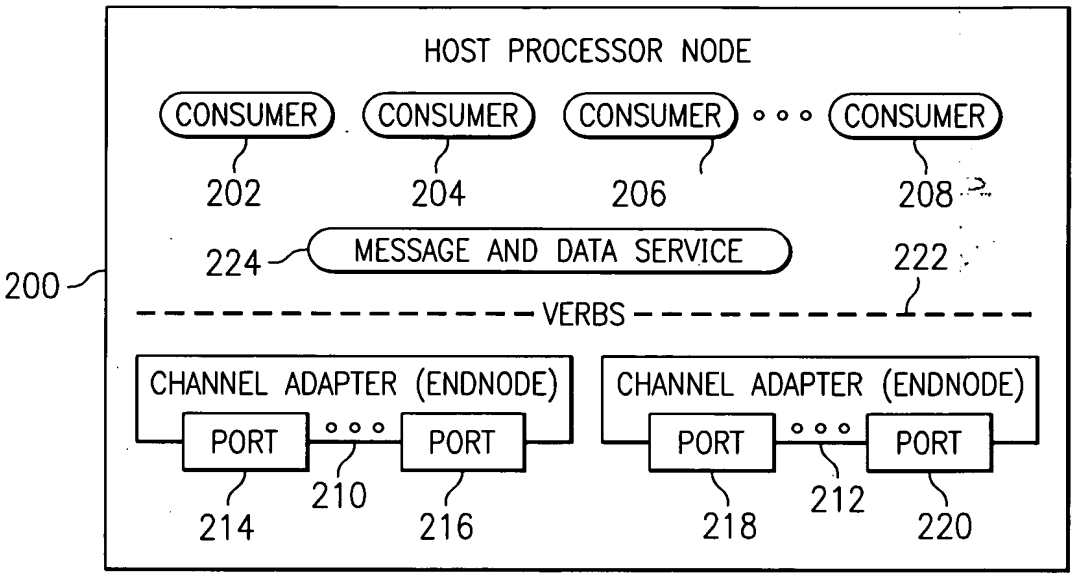

HOST PROCESSOR NODE
CONSUMER
CONSUMER
CONSUMER
CONSUMER
202
204
206
208
224
MESSAGE AND DATA SERVICE
222
200
VERBS
CHANNEL ADAPTER (ENDNODE)
PORT
PORT
210
214
216
CHANNEL ADAPTER (ENDNODE)
PORT
PORT
212
218
220

FIG. 3A

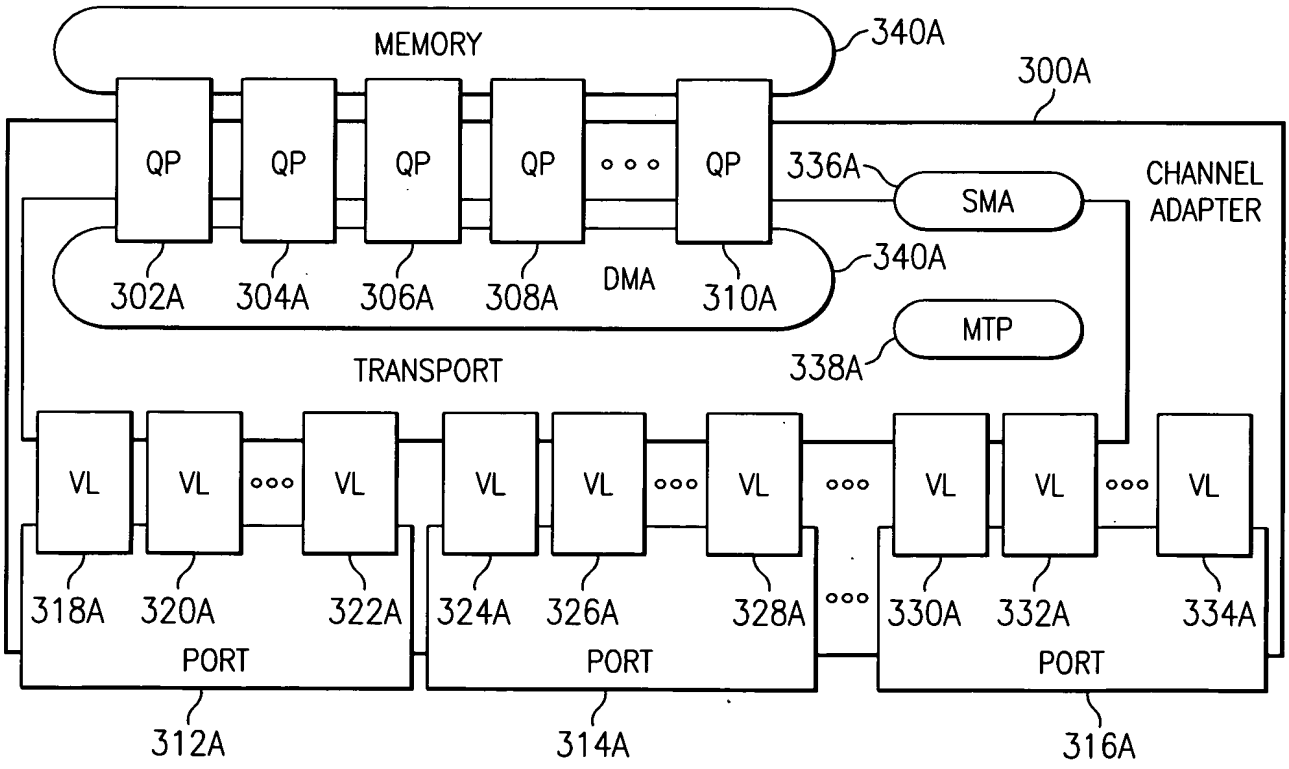

MEMORY
340A
300A
QP
QP
QP
QP
QP
336A
SMA
CHANNEL ADAPTER
340A
302A
304A
306A
308A
DMA
310A
MTP
338A
TRANSPORT
VL
VL
VL
VL
VL
VL
VL
VL
VL
318A
320A
322A
324A
326A
328A
330A
332A
334A
PORT
PORT
PORT
312A
314A
316A

FIG. 3B

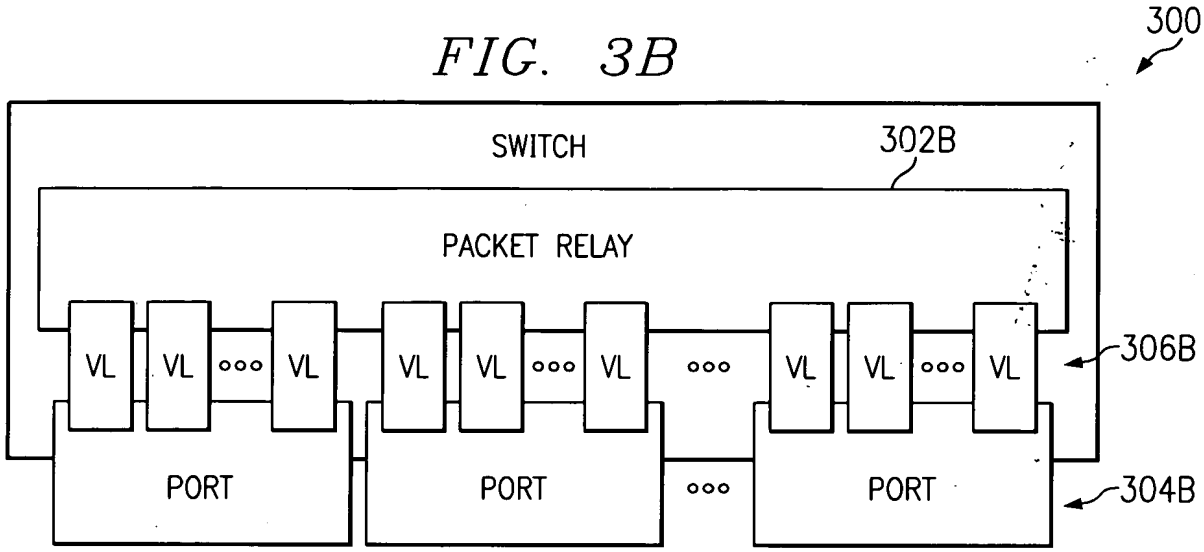
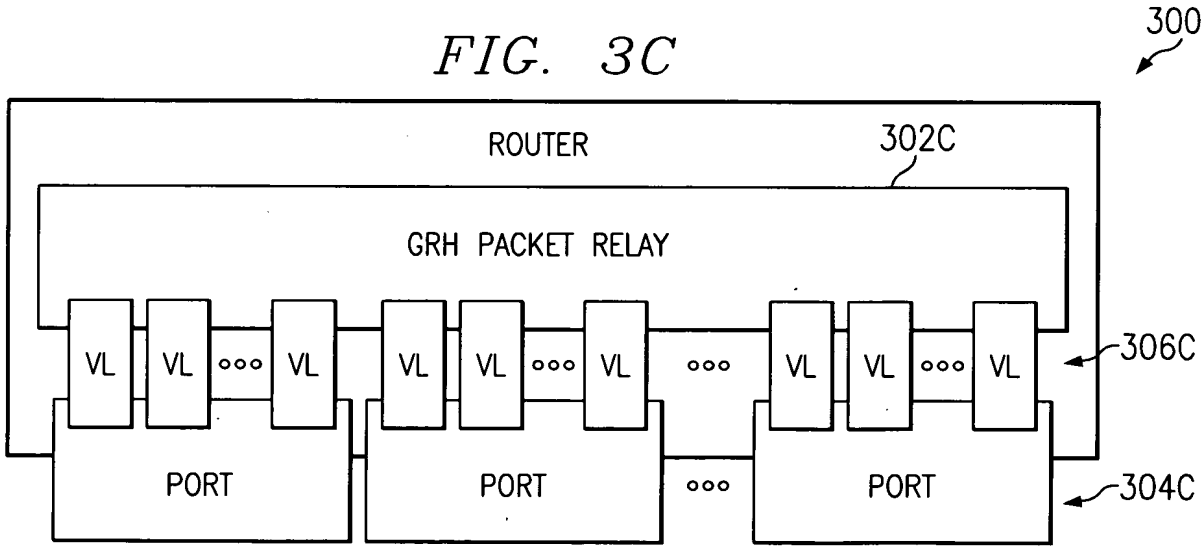

300B
SWITCH
302B
PACKET RELAY
VL
VL
VL
VL
VL
VL
VL
VL
VL
VL
VL
306B
PORT
PORT
PORT
304B

FIG. 3C


300C
ROUTER
302C
GRH PACKET RELAY
VL
VL
VL
VL
VL
VL
VL
VL
VL
VL
VL
306C
PORT
PORT
PORT
304C

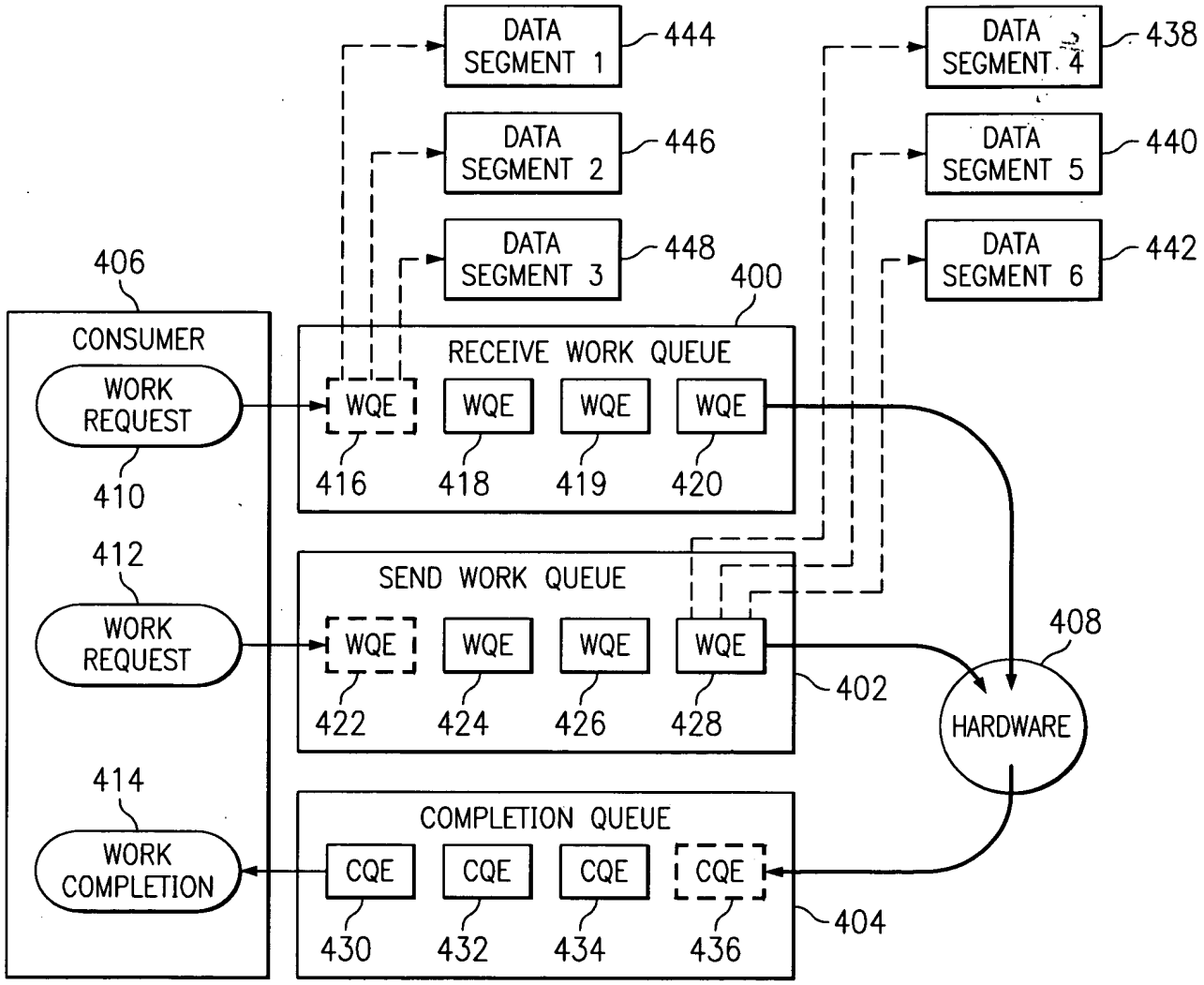

DATA SEGMENT 1
444
DATA SEGMENT 2
446
DATA SEGMENT 3
448
DATA SEGMENT 4
438
DATA SEGMENT 5
440
DATA SEGMENT 6
442
406
CONSUMER
WORK REQUEST
410
412
WORK REQUEST
414
WORK COMPLETION
400
RECEIVE WORK QUEUE
WQE
WQE
WQE
WQE
416
418
419
420
SEND WORK QUEUE
WQE
WQE
WQE
WQE
422
424
426
428
402
408
HARDWARE
COMPLETION QUEUE
CQE
CQE
CQE
CQE
430
432
434
436
404

FIG. 4

FIG. 5

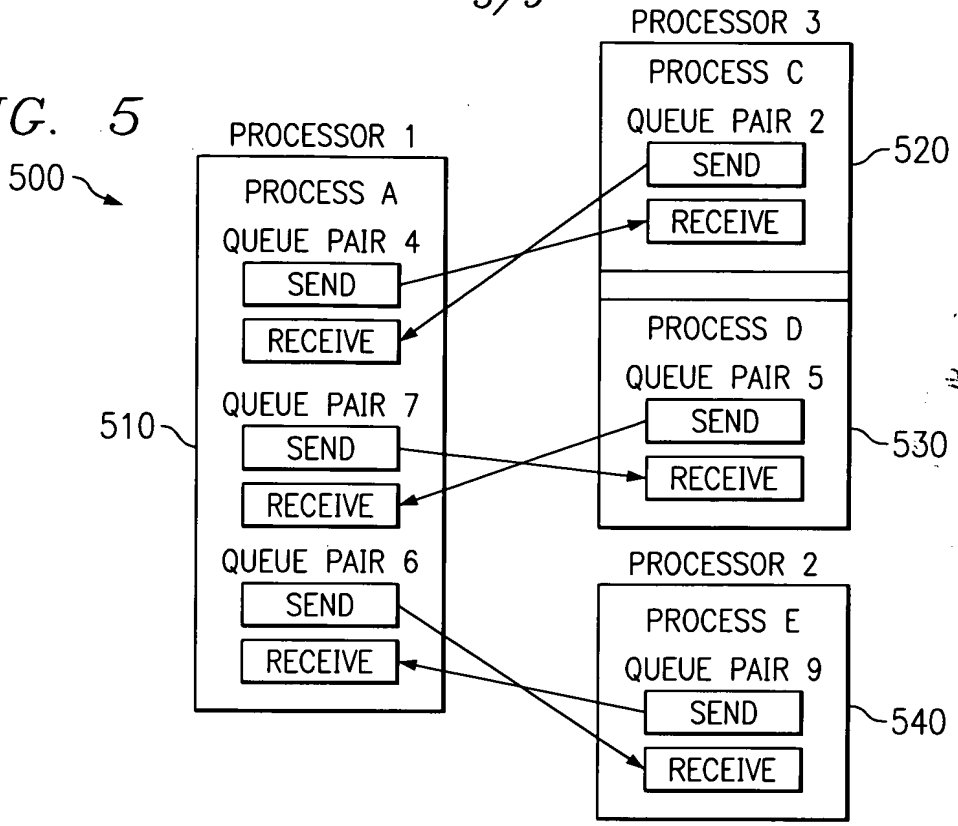

500
PROCESSOR 1
PROCESS A
QUEUE PAIR 4
SEND
RECEIVE
QUEUE PAIR 7
SEND
RECEIVE
QUEUE PAIR 6
SEND
RECEIVE
510
PROCESSOR 3
PROCESS C
QUEUE PAIR 2
SEND
RECEIVE
520
PROCESS D
QUEUE PAIR 5
SEND
RECEIVE
530
PROCESSOR 2
PROCESS E
QUEUE PAIR 9
SEND
RECEIVE
540

FIG. 6

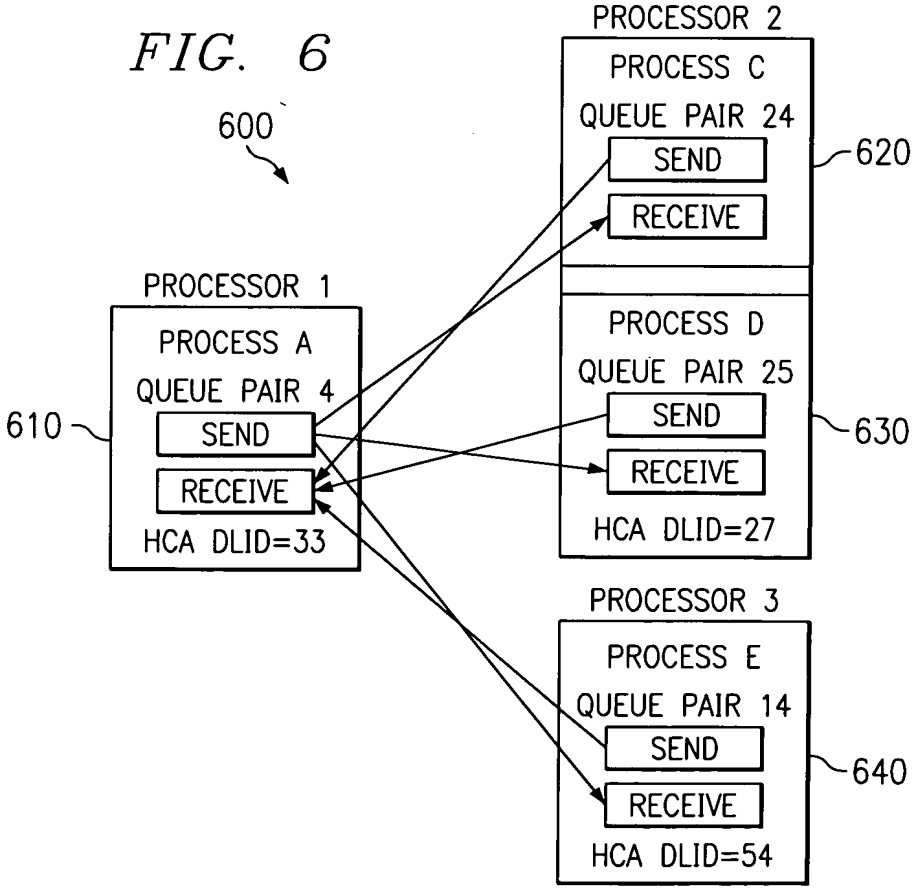

600
PROCESSOR 2
PROCESS C
QUEUE PAIR 24
SEND
RECEIVE
620
PROCESSOR 1
PROCESS A
QUEUE PAIR 4
SEND
RECEIVE
HCA DLID=33
610
PROCESS D
QUEUE PAIR 25
SEND
RECEIVE
HCA DLID=27
630
PROCESSOR 3
PROCESS E
QUEUE PAIR 14
SEND
RECEIVE
HCA DLID=54
640

FIG. 7

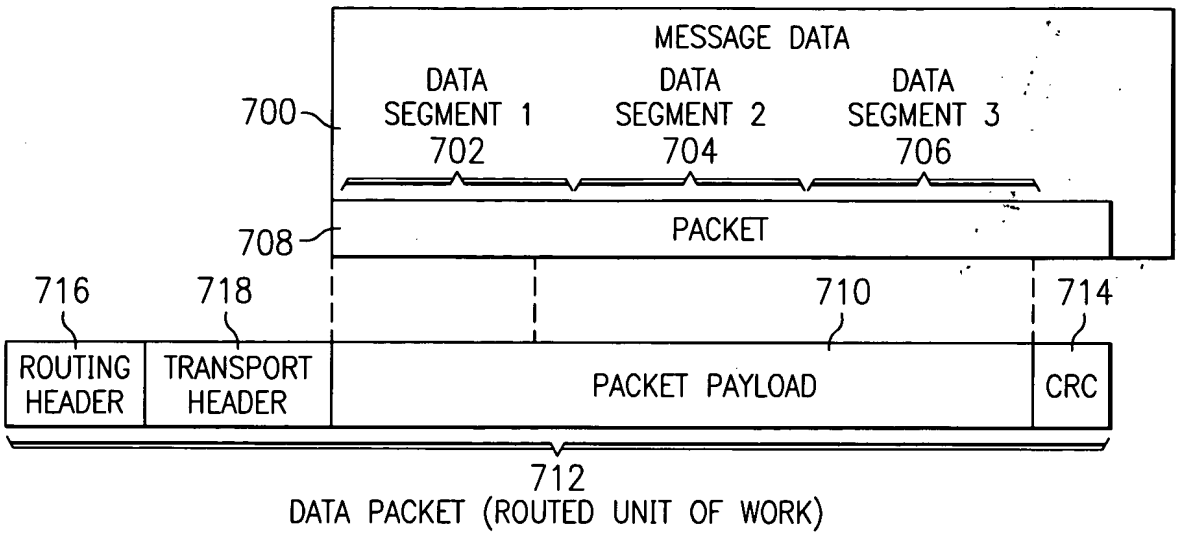

MESSAGE DATA
DATA SEGMENT 1
DATA SEGMENT 2
DATA SEGMENT 3
700
702
704
706
PACKET
708
716
718
710
714
ROUTING HEADER
TRANSPORT HEADER
PACKET PAYLOAD
CRC
712
DATA PACKET (ROUTED UNIT OF WORK)

FIG. 8

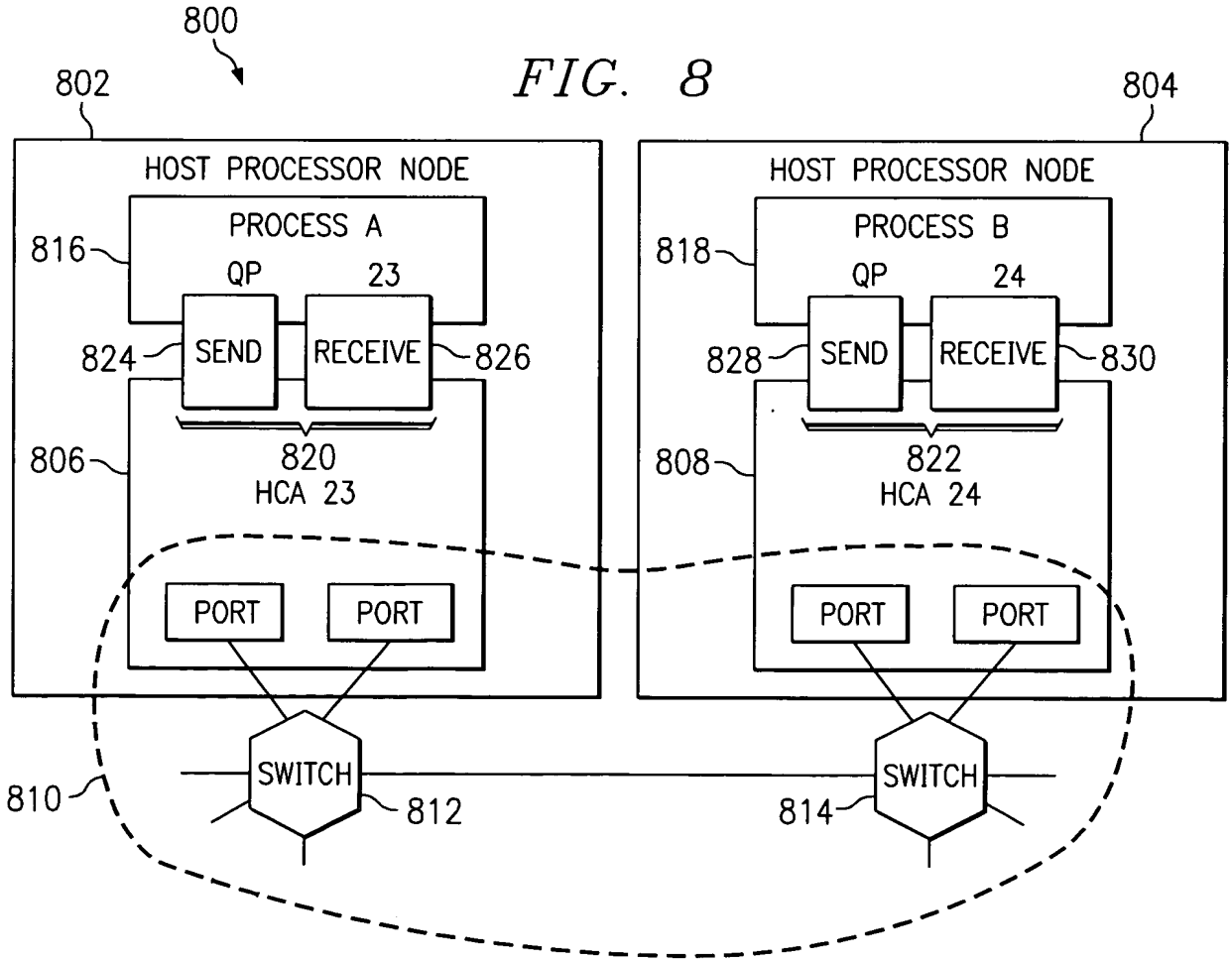

800
802
804
HOST PROCESSOR NODE
HOST PROCESSOR NODE
PROCESS A
PROCESS B
816
818
QP 23
QP 24
824
SEND
RECEIVE
826
828
SEND
RECEIVE
830
806
820
HCA 23
808
822
HCA 24
PORT
PORT
PORT
PORT
SWITCH
SWITCH
810
812
814

FIG. 9

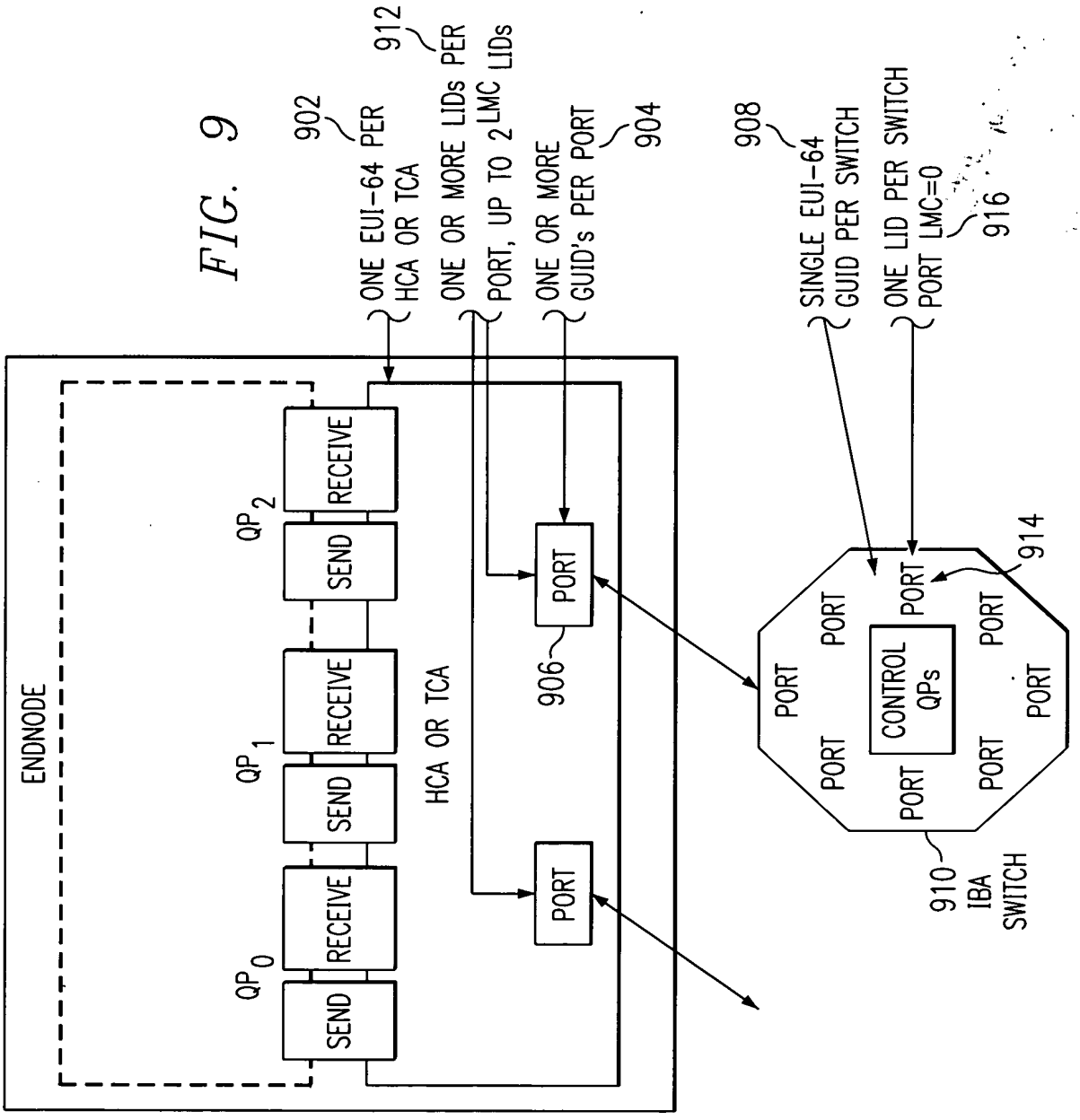
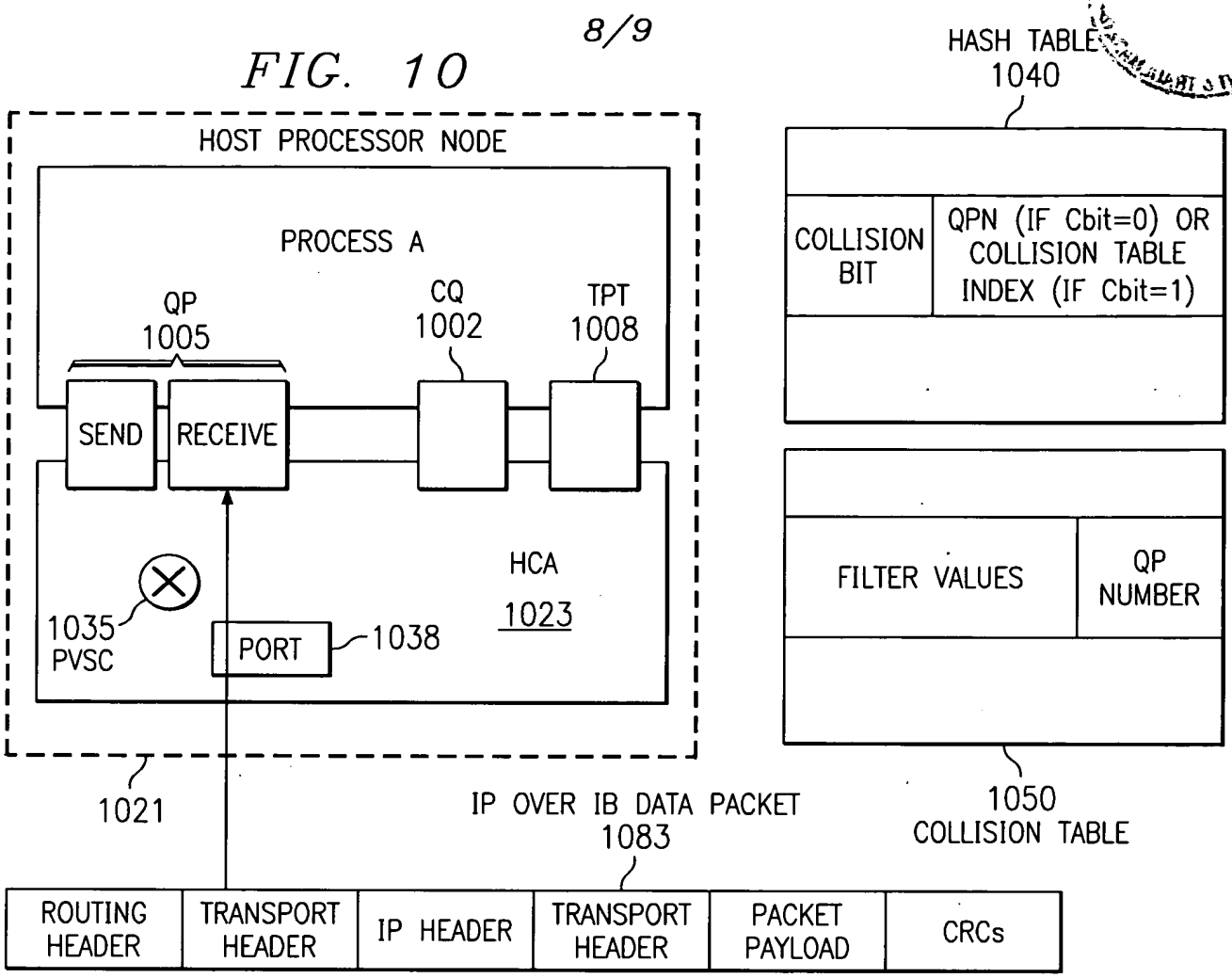

902
ONE EUI-64 PER HCA OR TCA
912
ONE OR MORE LIDs PER PORT, UP TO 2LMC LIDs
904
ONE OR MORE GUID's PER PORT
908
SINGLE EUI-64 GUID PER SWITCH
ONE LID PER SWITCH PORT LMC=0
916
ENDNODE
QP0
QP1
QP2
SEND
RECEIVE
HCA OR TCA
PORT
906
914
CONTROL QPs
910
IBA SWITCH

FIG. 10


HOST PROCESSOR NODE
PROCESS A
QP
1005
CQ
1002
TPT
1008
SEND
RECEIVE
HCA
1023
1035
PVSC
PORT
1038
1021
HASH TABLE
1040
COLLISION BIT
QPN (IF Cbit=0) OR COLLISION TABLE INDEX (IF Cbit=1)
FILTER VALUES
QP NUMBER
1050
COLLISION TABLE
IP OVER IB DATA PACKET
1083
ROUTING HEADER
TRANSPORT HEADER
IP HEADER
TRANSPORT HEADER
PACKET PAYLOAD
CRCs

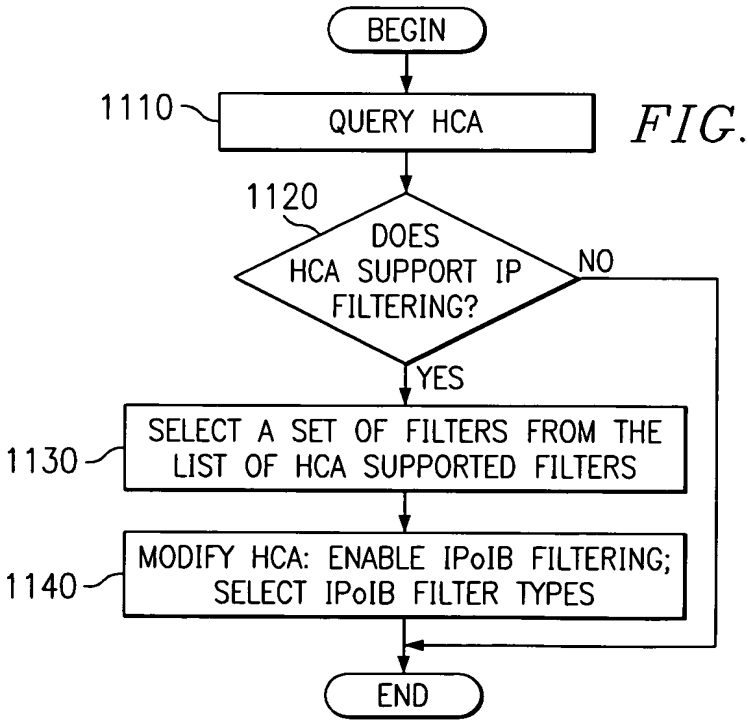

BEGIN
1110
QUERY HCA
1120
DOES HCA SUPPORT IP FILTERING?
NO
YES
1130
SELECT A SET OF FILTERS FROM THE LIST OF HCA SUPPORTED FILTERS
1140
MODIFY HCA: ENABLE IPoIB FILTERING; SELECT IPoIB FILTER TYPES
END

FIG. 11

FIG. 12

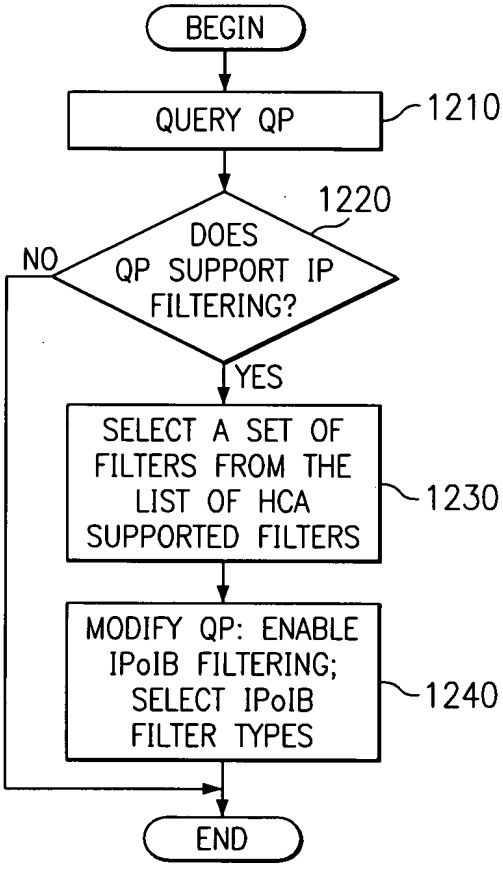
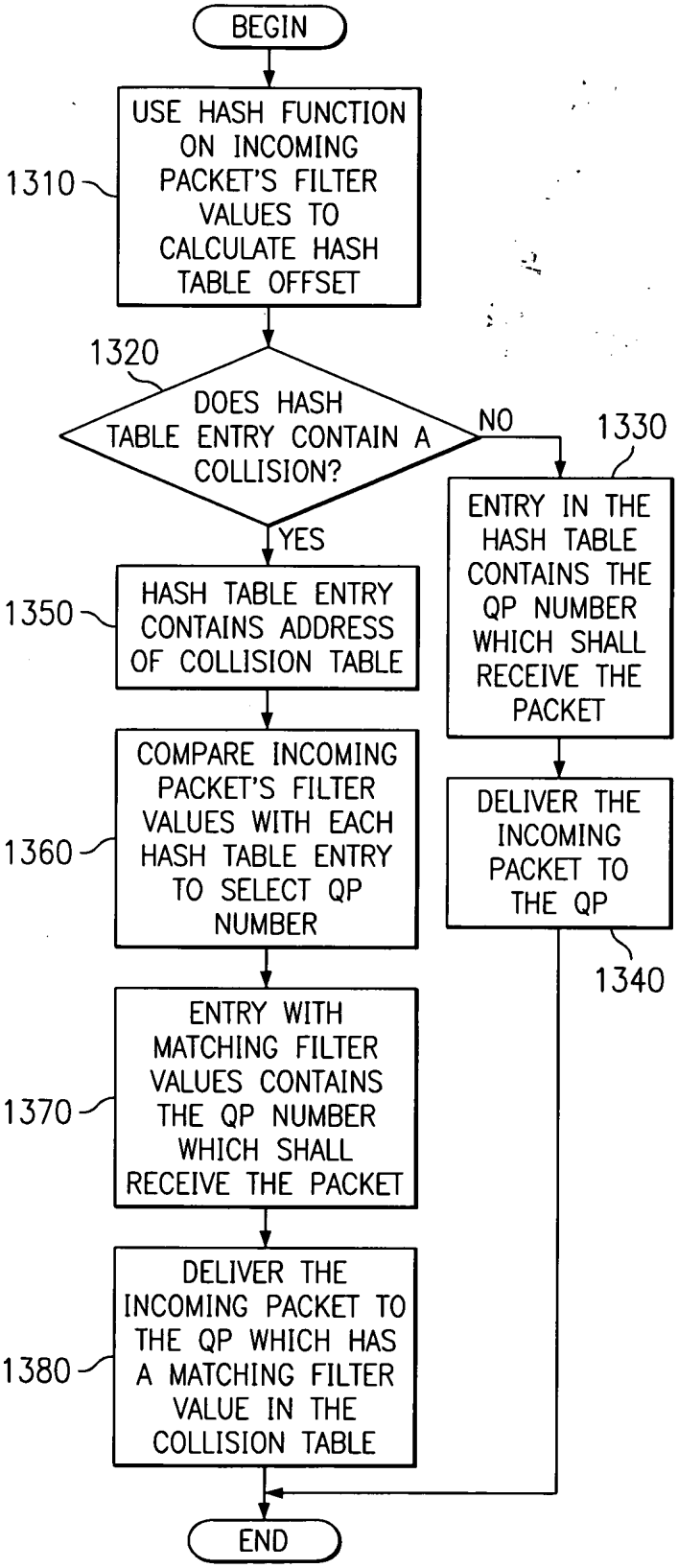

BEGIN
QUERY QP
1210
DOES QP SUPPORT IP FILTERING?
1220
NO
YES
SELECT A SET OF FILTERS FROM THE LIST OF HCA SUPPORTED FILTERS
1230
MODIFY QP: ENABLE IPoIB FILTERING; SELECT IPoIB FILTER TYPES
1240
END

FIG. 13


BEGIN
USE HASH FUNCTION ON INCOMING PACKET'S FILTER VALUES TO CALCULATE HASH TABLE OFFSET
1310
1320
DOES HASH TABLE ENTRY CONTAIN A COLLISION?
NO
1330
YES
ENTRY IN THE HASH TABLE CONTAINS THE QP NUMBER WHICH SHALL RECEIVE THE PACKET
HASH TABLE ENTRY CONTAINS ADDRESS OF COLLISION TABLE
1350
DELIVER THE INCOMING PACKET TO THE QP
1340
COMPARE INCOMING PACKET'S FILTER VALUES WITH EACH HASH TABLE ENTRY TO SELECT QP NUMBER
1360
ENTRY WITH MATCHING FILTER VALUES CONTAINS THE QP NUMBER WHICH SHALL RECEIVE THE PACKET
1370
DELIVER THE INCOMING PACKET TO THE QP WHICH HAS A MATCHING FILTER VALUE IN THE COLLISION TABLE
1380
END